# Managing Commodity Price Risk Using Hedging and Options

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**Factsheet**

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This Factsheet provides an overview of commonly-used price risk management tools as well as concise and easily understandable definitions of terms used by those providing risk management advice.

## PURPOSE OF FUTURES MARKETS

Futures markets are price discovery and risk management institutions. In futures markets, the competing expectations of traders interact to "discover" prices. In so doing, they reflect a broad range of information that exists on upcoming market conditions. Futures markets are actually designed as vehicles for establishing future prices and managing risk so you can avoid gambling if you want.

For example, a wheat producer who plants a crop is, in effect, betting that the price of wheat won't drop so low that he would have been better not to have planted the crop at all. This bet is inherent to the farming business, but the farmer may prefer not to make it. The farmer can *hedge* this bet by selling a wheat *futures contract*.

## CONTRACTS

Futures contracts are sometimes confused with *forward contracts*. While similar, they are not at all the same.

### Forward Contracts

A forward contract is an agreement between two parties (such as a wheat farmer and a cereal manufacturer) in which the seller (the farmer) agrees to deliver to the buyer (cereal manufacturer) a specified quantity and quality of wheat at a specified future date at an agreed-upon price. It is a privately negotiated contract that is not conducted in an organized marketplace or exchange.

Both parties to a forward contract expect to make or receive delivery of the commodity on the agreed-upon date. It is difficult to get out of a forward contract unless the other party agrees.

All forward contracts specify quantity, quality and delivery periods. If any of these conditions are not met, the farmer will usually have to financially compensate the buyer. It is essential you understand your legal obligations before entering into a forward contract in case you cannot meet the conditions of the contract.

### Futures Contracts

Futures contracts, while similar to forward contracts, have certain features that make them more useful for risk management. These include being able to extinguish contract obligations through *offsetting*, rather than actual delivery of the commodity. In fact, very few futures contracts are ever delivered upon.

Futures contracts are traded on organized exchanges in a variety of commodities (including grains, livestock, bonds and currencies). They are traded by open *outcry* where traders and brokers shout bids and offers from a trading pit at designated times and places. This allows producers, users and processors to establish prices before commodities are traded. Futures prices are forecasts that can and do change according to a variety of reasons, such as crop or weather reports.

## TRADERS

There are basically two types of traders: hedgers and speculators.

Hedgers are people who produce, process or use commodities and want to reduce their price risk or establish prices for commodities they will trade in the future.

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Speculators are people who attempt to profit through buying and selling, based on price changes, and have no economic interest in the underlying commodity.

Futures contracts have standardized terms established by the exchange. These include the volume of the commodity, delivery months, delivery location and accepted qualities and grades. The contract specifications differ, depending on the commodity in question.

This standardization makes it possible for large numbers of participants to trade the same commodity, which also makes the contract more useful for *hedging*.

## TRADING GAINS AND LOSSES

It helps to study speculation first — trading futures without an interest in the underlying commodity — in order to understand hedging.

**Example**

September corn is trading at $3.50/bu, but you believe the price will be lower than this in September. You might take a "short position" (sell futures), and if the price falls, profit from offsetting with a "long position" (buying back futures):

| Date | Position |
|---|---|
| May 7 | Short (sell) Sept corn @$3.50/bu |
| May 27 | Long (buy) Sept corn @$3.25/bu |
| Profit | $0.25/bu |

However, if prices rise, you would lose when you offset the position:

| Date | Position |
|---|---|
| May 7 | Short September corn @ $3.50/bu |
| May 27 | Long September corn @$3.60/bu |
| Loss | $(0.10)/bu |

Speculating is gambling; trading action either generates an absolute loss or an absolute gain. Hedging, in contrast, creates price stability.

## TRADING ON MARGIN

To trade futures positions, financial capital must be in place with the exchange and with a broker. However, only a small portion of the value of the position being traded is required. For example, if soybeans are trading at $7.00/bu, the total value of a 5,000-bushel contract is $35,000, but only a small portion of this value must be in place to begin trading (typically between 2% and 10% of the total value of the contract). Futures trading is conducted using a margin account.

An important implication of trading on margin is that losses against trading positions must be covered on a dollar-for-dollar basis by the trader.

A futures trader entering into a futures position is required to post an initial margin amount specified by the exchange. Thereafter, the position is "marked to the market" daily — that is to say, if the futures position loses value, the amount in the margin account will decline accordingly.

If the amount of money in the margin account falls below the specified maintenance margin (which is set at a level less than or equal to the initial margin), the futures trader will be required to post additional variation margin to bring the account up to the initial margin level.

On the other hand, if the margin position is positive, this amount will be added to the margin account. It is important to understand the impact that these margin calls can have on cash flow as they are assessed daily. If the margin level falls below the maintenance margin, the trader must top up the account immediately to avoid losing the futures position. It is important that lenders and financial managers are aware of the potential cash flow commitments that can result. Even futures trading that eventually generates a profit can accrue significant cash obligations for margin servicing over the life of the position.

### Basis

"Basis" is the difference between local cash price and a nearby futures price, quoted in common currency. For example, if the nearby futures price is $4.75, and cash is $4.55, then basis is $0.20 under (–$0.20). If the futures price is $4.75 and cash is $4.95, basis is $0.20 over (+$0.20).

Basis is typically measured against the nearest futures month after a cash transaction. For example, a cash corn transaction occurring in March will be measured against the May futures price; a forward price for November will be matched to the December futures, etc.

The basis measures local supply-and-demand conditions relative to the futures delivery region. The basis in regions with surplus production will have a more negative basis (or less positive); in deficit production regions, the basis will be more positive (or less negative). Many factors can influence basis,

notably changes in local supply-and-demand balance and transportation costs. Basis also represents the portion of price risk that cannot be mitigated by hedging.

## HEDGING

To hedge is to take a futures position that is *equal* and *opposite* to a position held in the cash market. The objective is to mitigate the risk of an adverse move in prices.

Hedging works in mitigating price risk because futures prices and cash prices are highly correlated. For example, a producer of soybeans has the risk that the cash price will decrease before the beans are harvested and can be sold. Selling soybean futures mitigates this risk. If the cash soybean price in fact declines, the futures price will have decreased as well. Then, the producer can buy back (or offset) the futures contract for less than he sold it for, generating a profit. This profit can be applied to the revenue he gets from selling the soybeans on the cash market, thereby mitigating the cash price decrease.

Hedging using futures very seldom results in delivery against the futures contract; contracts are liquidated via offset and do not result in delivery. The purpose of the delivery provision is to ensure convergence between futures price and the cash market price. It is the threat of delivery that causes cash and futures to come together.

### Short Hedging

A person who already owns or is in the process of producing a commodity has the risk that the price will fall. This risk can be mitigated by *selling* futures (short hedge), protecting the hedger from a decline in the price of the commodity/product owned or being produced.

#### *Examples of short hedgers:*

- A farmer with livestock on feed or a crop in the field.
- An elevator with grain inventory in the elevator.
- An elevator that has contracted to accept delivery of grain in the future at a fixed price.
- A meat packer who has contracted to accept animal delivery in the future.

The risk here is that prices may fall before delivery.

#### *Short Hedge Example*

As an example, suppose it is May and a corn producer is considering pricing his corn crop. Based on history, the producer expects the basis at harvest to be $0.10 over December futures, which are currently trading at $3.50. The elevator is currently offering a forward price that is $0.05 over December. The producer's risk is that corn prices will fall, so to hedge with futures, the producer takes a short futures position. As the corn is being harvested in November, the futures price has fallen to $3.00, and the local basis is still $0.05 over December. The producer buys back the short position, resulting in a $0.50 profit, which he combines with the $3.05 cash price to obtain a net price of $3.55, thereby mitigating the effect of the price decrease. Conversely, if the futures price had increased by $0.50, a loss on futures would result, and the net price would remain $3.55.

| Date | Cash | Futures |
|---|---|---|
| May | $3.55 | Short @ $3.50 |
| November | $3.05 | Long @ $3.00 |
| Profit | | $.50 |
| Net Price | $3.55 | |

### Long Hedging

A person who does not now own the cash commodity but will require it in the future has the risk that the price will increase. *Buying* futures (long hedge) can mitigate this risk. A long hedge protects the hedger from a rise in price.

#### *Examples of long hedgers:*

- A food manufacturer, who will need product in the future, doesn't own it now but wants to price it now.
- A processor who has offered to price product forward based on current ingredients prices but doesn't own it now.

The risk here is that the price will rise before delivery.

#### *Long Hedge Example*

Alternatively, a flour miller is concerned about the risk of wheat price increases for wheat to be purchased in November. Wheat futures for December delivery are currently trading at $4.20/bu, and the typical basis at the miller's location is $0.15 over futures. The miller hedges this risk by taking a long position (buying) the December wheat future at $4.20. In November, the futures price has increased to $4.40, and wheat is selling locally for $4.55. The miller lifts

the hedge by selling back the futures position at $4.40, resulting in a profit of $0.20/bu. This profit is then applied to the cash purchase cost of $4.55/bu, resulting in a net cost of $4.35, which is the price expected when the hedge was placed.

| Date | Cash | Futures |
|---|---|---|
| August | | Long @ $4.20 |
| November | $4.55 | Short @ $4.40 |
| Profit | | $.20 |
| Net Price | $4.35 | |

In both of these examples, the basis component of pricing did not change. In practice, basis can be variable, but this variation is small, relative to that in the futures price. The basis risk cannot be protected through hedging.

What makes hedging work is the fact that cash and futures prices converge at the delivery point — when one goes up, the other goes up as well.

The hedger takes an *equal but opposite position* in the futures market to the one held in the cash market to avoid the risk of an adverse price move. However, by doing this, the hedger forfeits any advantage of a cash price improvement.

## OPTIONS

Options are like insurance — you can cash them in when bad things happen (such as a drop in futures price) but you don't collect when good things happen (such as a rise in futures price). You are paying someone to take on your futures risk.

There are two types of options: PUT and CALL.

The PUT option sets a minimum price for the contracted amount of grain or livestock. This gives the buyer the *right but not the obligation* to take a short position in the underlying futures at a specific price (called the *strike price*) within a specified time period.

When a farmer buys a PUT option, for a premium, there is the option to sell or go short on a specific futures market contract if the price of that contract falls below the strike price. The strike price level, less the premium for the PUT option, establishes the minimum price the farmer will receive for the contracted commodity.

The CALL option sets a maximum price for the contracted amount of grain or livestock. This gives the buyer the *right but not the obligation* to take a long position in the underlying futures at the strike price within a specified time period.

When the farmer buys a CALL option, for a premium, there is the option to buy or go long on a specific futures market contract if the price of that contract rises above the strike price. The strike price level, less the premium for the call option, establishes the maximum price the buyer will pay for the contracted commodity.

Once an option has been purchased, the buyer (holder) has three alternatives. First, the option can be allowed to expire. Second, the option can be sold to someone else or offset; the original buyer, by selling to a third party, has transferred his rights to that party. Third, the option can be exercised, essentially demanding that the seller provide the underlying futures position.

Options are not purchased on margin; one advantage is not having to make margin calls when the market moves. For example, with a PUT option, you are protected against the downside but get the benefit of the upside in prices. The perceived benefit of this is dependent on the premium paid.

### Premium Values

The option premium is the price that the option trades for. This is determined through competitive bids and offers, but two key considerations guide this process.

The first is intrinsic value, which refers to how profitable an option would be if it were executed. The option profitability is measured by comparing the strike price to the current price of the underlying futures contract.

The second is time value. As the perceived price volatility increases and/or if the time to expiry is longer, the value of an option increases. It is a combination of these two factors that determines the premium on the option.

## HEDGING WITH OPTIONS

Hedging with options is similar to hedging with futures. The main difference is that options are purchased and resold, with the gain in the option value used to offset negative price risk. When futures are used to hedge, it is the change in the value of futures prices directly that generates gains or losses that mitigates price risk.

## CONCLUSION

This Factsheet provides a basic overview of the commodity price risk management tools and terminology. It is not meant to be the only source of information. Anyone planning on using futures as a business risk management tool is encouraged to take a commodity-marketing course and to use the services of a professional futures broker.

## RESOURCES

Chicago Board of Trade – *www.cbot.com*

Chicago Mercantile Exchange – *www.cme.com*

ICE Futures Canada (ICE) – *www.theice.com/wce.jhtml*

DTN – *www.dtn.com*

George Morris Centre – *www.georgemorris.org*

Farms.com – *www.farms.com*

Canadian Farm Business Management Council – *www.farmcentre.com*

Ontario Ministry of Agriculture, Food and Rural – *www.ontario.ca/agbusiness*

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